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The substrate strip includes a frame having a pair of parallel supporting bars, and a substrate linked to the supporting bars by means of no more than two external tie bars (see, e.g., claim 1). The tie bars are arranged on either two adjacent corners, two diagonally opposite corners, or with one tie bar on the corner and the other tie bar on a side of the substrate. Thus, at least two corners of the substrate are not linked to the tie bars, and the substrate can freely extend toward the corners where no tie bars are provided when subject to thermal stress.

Claims 1-5 and 9-12 were rejected under 35 USC 103(a) as being unpatentable over U.S. Patent 5,925,934 to Lim in view of "admitted prior art (APA)". Claims 7, 8, and 14-16 were rejected under 35 USC 103(a) as being unpatentable over Lim in view of "APA," and further in view of U.S. Patent 5,847,446 to Park et al. (hereinafter "Park"). These rejections are respectfully traversed. Claims 6 and 13 were not rejected over any prior art; therefore, these claims are presumed to be allowable.

Lim does not teach or suggest a substrate which is linked to supporting bars by means of no more than two external tie bars.

Lim is directed to a chip-sized package (CSP) which does not have a substrate. Referring to FIG. 10A, tie bars 530 are attached to the inactive surface 515 of a chip 505. As shown in FIG. 10B, a molding compound 545 encapsulates the chip 505, the metallic frame tie-bars 530, and the array of chip interconnect bumps 520 except for leaving the lower surfaces 525 of the chip interconnect bumps 520 exposed.

Prior art FIGS. 1A and 1B, as discussed in the Background of the Invention section of the application, relate to a typical BGA package. As shown in FIG. 1A, a chip 20 is disposed on a substrate 11, and is not in contact with a tie bar (see also FIG. 1B). Namely, the tie bar does not touch any surfaces, i.e., the active or inactive surfaces, of the chip. The chip is electrically coupled to a printed circuit board 40 through a ball grid array 30 on the lower surface 11b of the substrate 11. While the chip 20 is encapsulated in a molding compound, the substrate is not encapsulated in the molding compound.

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Referring to FIG. 1B, the prior art package structure includes a frame having supporting bars 12a and 12b, where a substrate 11 is linked to the supporting bars 12a and 12b by tie bars 13a, 13b, 13c, and 13d (see specification at page 2, lines 9-15).

The package structures disclosed in Lim and "APA" (i.e., prior art FIGS. 1A and 1B) are not compatible. Lim teaches a package which does not include a substrate. In Lim, a frame 570 is made by forming a cavity or cut-out 575 in a strip 580 (see column 6, lines 64-65). However, the frame taught by Lim is only a frame with a cavity, and does not include supporting bars such as those disclosed in "APA." If it were attempted to modify Lim with "APA," the supporting bars disclosed in "APA" would be unnecessary, since such supporting bars are provided to support a **substrate**, which is missing from Lim. Moreover, in contrast to Lim, "APA" teaches a chip encapsulated in molding compound, while the substrate is not encapsulated, and the tie bars are not in contact with the chip.

In the Office Action, it was alleged that the frame 570 of Lim somehow constitutes "a first supporting bar and a second supporting bar" (see Office Action, page 2, middle of page). However, in Lim, the frame is a continuous structure formed with a cavity 575 for supporting a chip 505 (see column 6, lines 64-65), not a substrate. There is no teaching or suggestion of supporting bars provided on the frame for supporting a substrate, as required in claims 1, 9, and 14. Moreover, the structure disclosed in Lim is not capable of preventing warpage caused by thermal stresses, as provided in the Applicants' claimed invention.

For at least the reasons explained above, the proposed combination of Lim in view of "APA" does not teach or suggest the Applicants' claimed invention. Therefore, independent claims 1 and 9, and their respective dependent claims, are patentable over the proposed combination.

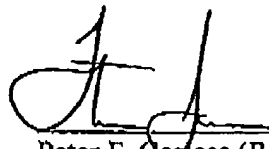
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However, because Lim does not teach or suggest use of a pad or substrate, the proposed modification of Lim in view of "APA," and further in view of Park would not teach or suggest the Applicants' claimed invention as recited in claim 14.

Accordingly, independent claim 14 and its dependent claims are patentable over the combination of Lim in view of "APA," and further in view of Park.

It is believed the application is in condition for immediate allowance, which action is earnestly solicited.

Respectfully submitted,



Peter F. Corless (Reg. No. 33,860)  
Steven M. Jensen (Reg. No. 42,693)  
EDWARDS & ANGELL, LLP  
P.O. Box 55874  
Boston, MA 02205

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Phone: (617) 439-4444

Customer No. 21874